

## IN THE CLAIMS

This listing of claims replaces all previous versions:

1. (Currently Amended) A smart pipette for bio-cell manipulation, ~~which, together with a vision unit, a haptic unit, a control unit, a graphic user interface and a holding pipette, constitutes a micro manipulation device, comprising:~~

a holding pipette that fixes a location of a bio-cell;

an injection pipette that manipulates the bio-cell;

an orientation adjusting unit formed on the injection pipette, which contacts the bio-cell and that changes an orientation of a the bio-cell using friction with the bio-cell whose location has been fixed by the holding pipette; and

a sensor unit that obtains force/torque information concerning the bio-cell and the smart pipette at the time of the bio-cell manipulation.

2. (Currently Amended) The smart pipette for bio-cell manipulation according to claim 1, wherein the orientation adjusting unit has same degree of freedom as the smart pipette ~~micro-manipulation device and may change the orientation of the bio-cell.~~

3. (Original) The smart pipette for bio-cell manipulation according to claim 1, wherein the orientation adjusting unit is suitable for a living body.

4. (Original) The smart pipette for bio-cell manipulation according to claim 1, wherein the orientation adjusting unit is a polymer.

5. (Currently Amended) The smart pipette for bio-cell manipulation according to claim 1, wherein the orientation adjusting unit is located apart from a tip of the injection pipette at least by certain length that would make ~~it~~ said orientation adjusting unit not interfere with penetration into the bio-cell.

6. (Canceled)

7. (Original) The smart pipette for bio-cell manipulation according to claim 1, wherein the orientation adjusting unit changes orientation of the bio-cell when the holding pipette's force that holds the bio-cell has been weakened.

8. (Canceled)

9. (Currently Amended) The smart pipette for bio-cell manipulation according to claim 1, wherein the sensor unit is a piezo-electric polymer sensor.

10. (Original) The smart pipette for bio-cell manipulation according to claim 1, wherein the sensor unit is a cantilever type.

11. (Original) The smart pipette for bio-cell manipulation according to claim 2, wherein the orientation adjusting unit changes orientation of the bio-cell to directions of x, y or z axes.

12. (Original) The smart pipette for bio-cell manipulation according to claim 4, wherein the polymer is polydimethylsiloxane (PDMS).

13. (Canceled)

14. (Original) The smart pipette for bio-cell manipulation according to claim 9, wherein the piezo-electric polymer is polyvinylidene fluoride (PVDF) film.

15. (Original) The smart pipette for bio-cell manipulation according to claim 1, further comprising a minute driver for minute manipulation of the smart pipette.

16. (Currently Amended) The smart pipette for bio-cell manipulation according to claim 15, wherein the minute driver conducts impact driving using ~~the~~ a graphic user interface.

17. (Currently Amended) A bio-cell manipulation method using a smart pipette ~~including a sensor unit~~, comprising:

- (a) fixing the location of a bio-cell;
- (b) changing the orientation of the bio-cell using friction between the bio-cell and an orientation adjusting unit formed on an injection pipette;
- (c) manipulating the bio-cell using the injection pipette;
- (ad) quantifying force/torque information acquired through a ~~the~~ sensor unit during said step of manipulating bio-cell manipulation;
- (be) transmitting the quantified force/torque information to a graphic user interface; and
- (ef) manipulating the bio-cell based upon the force/torque information transmitted in said step (be).

18. (Currently Amended) The bio-cell manipulation method using a smart pipette according to claim 17, wherein the force/torque information quantified in said step (ad) is measured by a piezo-electric sensor and then quantified.

19. (Currently Amended) The bio-cell manipulation method using a smart pipette according to claim 17, wherein in said step (be), the force/torque information is transmitted real time.

20. (Currently Amended) The bio-cell manipulation method using a smart pipette according to claim 17, wherein said step (ef) comprises: (dg) comparing the quantified force/torque information with data acquired through prior experiments; and (eh) conducting the bio-cell manipulation based upon the comparison made in said step (dg).

21. (Currently Amended) The bio-cell manipulation method using a smart pipette according to claim 20, wherein said step (eh) is a step of acquiring information about in which layer of the bio-cell a tip of the smart pipette is located based upon the comparison made in said step (dg).

22-27. (Canceled)